~~Patent Claims~~

1. A measuring apparatus having at least one microsensor (5), in which measuring apparatus the following holds true:
- the at least one microsensor (5) has at least two chambers (20, 30) filled with a gas,
- the chambers (20, 30) are connected to one another by a bushing, and
- the chambers (20, 30) are, moreover, sealed off to the outside in a gastight manner,
characterized
in that the bushing is designed as a channel (40), in which there is provided a detection apparatus (70) for detecting a gas stream flowing in the channel (40) on account of different pressures prevailing in the chambers.

2. The measuring apparatus as claimed in claim 1, characterized in that the detection device (70) is assigned a heating/cooling element by means of which the detection device can be heated or cooled to a measurement temperature which differs from the temperature of the gas in the chambers (20, 30).

3. The measuring apparatus as claimed in either of claims 1 and 2, characterized in that a change in the temperature of the detection device (70) is detected, said change taking place on account of the gas stream flowing between the chambers (20, 30) through the channel (40), and the detection device, as a reaction to this, supplies an electrical measurement signal at the output (72 and 74) of the detection device.

4. The measuring apparatus as claimed in one of claims 2 to 3, characterized in that the heating/cooling element coupled

to the detection device (70) is formed by an electrical heating resistor, a heating transistor or a heating diode.

5. The measuring apparatus as claimed in either of claims 2 and 3, characterized in that the heating/cooling element coupled to the detection device (70) is formed by a Peltier element.

6. The measuring device as claimed in one of claims 1 to 5, characterized in that the detection device (70) is formed by a thermoelement.

7. The measuring apparatus as claimed in one of claims 2 to 5, characterized in that the detection device (70) is formed by the heating/cooling element itself.

8. The measuring apparatus as claimed in one of claims 1 to 7, characterized in that a reference channel (50) which opens only in a chamber (30) is provided, a reference detection device (60) having predetermined electrical properties being assigned to said reference channel.

9. The measuring apparatus as claimed in one of claims 1 to 8, characterized in that an additional detection device (80) having predetermined electrical properties is assigned to the detection device (70), which additional detection device (80) is heated or cooled by the heated or cooled gas stream, respectively, the temperature of which has been altered by the detection device (70) at the measurement temperature, in the case of the gas stream direction from the detection device (70) to the additional detection device (80), and, as a reaction to this, supplies an electrical measurement signal at its output (82 and 84) and, in the case of a gas stream direction from the additional detection device (80) to the

detection device (70), supplies no measurement signal at its output (82 and 84).

10. The measuring apparatus as claimed in claim 8, characterized in that the detection device (70) and the reference detection device (80) are connected together in a measuring bridge circuit.

11. The measuring apparatus as claimed in claim 9 or 10, characterized in that both the detection device (70) and the reference detection device (60) or the additional detection device (80) are arranged in or on an edge region of a wall or are formed so as to comprise the wall.

12. The measuring apparatus as claimed in claim 11, characterized in that the wall is composed of semiconductor material.

13. The measuring apparatus as claimed in one of claims 9 to 12, characterized in that the chambers (20, 30) and the channels (40, 50) and/or the reference channel (50) of the microsensor (5) are formed in a semiconductor substrate (10).

14. The measuring apparatus as claimed in one of claims 9 to 13, characterized in that the additional detection device (80) is formed within at least one channel (40).

15. The measuring apparatus as claimed in one of claims 1 to 14, characterized in that one of the chambers (20, 30) has an elastic diaphragm effecting sealing-off to the outside.

16. The measuring apparatus as claimed in one of claims 1 to 15, characterized in that the microsensors (5) are arranged in

matrix form in rows and columns and can be driven by means of a drive circuit.

17. A method for producing a measuring apparatus having at least one microsensor (5), said apparatus being formed monolithically in a substrate, having the following steps:
- formation of at least two chambers (20, 30) with a bushing connecting the chambers (20, 30),
- formation of a detection device (70) for detecting a gas stream flowing in the bushing, which gas stream arises on account of different pressures prevailing in the chambers (20, 30),
- filling of the chambers (20, 30) and of the bushing with a gas, and
- gastight closure of the chambers (20, 30) to the outside, characterized
in that the bushing is formed as a channel (40), in which the detection apparatus (70) is arranged, and
in that a reference channel (50), which opens only into one chamber (30), is additionally formed.

18. The method as claimed in claim 17, characterized in that the closure of the chambers (20, 30) and the at least one channel (40) connecting the chambers is effected by the flowing of a covering material (17), the covering material being of a nature such that the chambers and the channels and also the reference channel (50) are not fully filled.

19. The method as claimed in claim 18, characterized in that the flowing of the covering material (17) takes place in the presence of a gas intended for the filling of the chambers (20, 30).

20. The method as claimed in claim 18 or 19, characterized in that the covering material (17) is borophosphorus silicate glass (BPSG).

21. The method as claimed in claim 17, characterized in that the chambers (20, 30), the at least one channel (40) connecting the chambers, and also the reference channel (50) in the substrate (10) and also the detection device (60) and also the reference and the additional detection devices (70 and 80) are fabricated by the following process steps:
- coating of the substrate (10) with a sacrificial layer (11), for example SiO_2,
- patterning of the detection device (60) and also of the reference and the additional detection devices (70 and 80) with their leads (61, 63, 71, 73, 81, 83) on the sacrificial layer (11), for example by means of an etching method,
- application of a second sacrificial layer (13),
- application of a covering layer (14), for example made of polycrystalline silicon,
- provision of the covering layer (14) with holes (15) at least partially in the regions under which the chambers (20, 30) and/or channels (40, 50) are intended to be produced,
- etching out of the two sacrificial layers (11 and 13) through the holes (15) in the covering layer (14) for the purpose of producing the chambers (20, 30) and/or channels (40, 50).

22. The method as claimed in one of claims 17 to 21, characterized in that at least a portion of the areas which are produced in the substrate (10) and form the at least two chambers (20, 30) and the at least one channel (40) connecting the chambers, and also the reference channel (50), is provided, prior to closure by means of the covering material (17), with a blocker layer (18) which prevents or at least

reduces diffusion of the filling gas into the surrounding semiconductor material (10).